Iran J Reprod Med Vol. 10. No.2. pp: 149-154, March 2012

Short communication

Correlation between PPARγ protein expression level in granulosa cells and pregnancy rate in IVF program

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Received: 6 January 2011
Revised: 18 April 2011
Accepted: 18 May 2011

Abstract

Background: Peroxisome proliferative-activated receptors (PPARs) are nuclear receptors that involved in cellular lipid metabolism and differentiation. The subtype γ of the PPAR family (PPARγ) plays important roles in physiologic functions of ovaries.

Objective: To determine correlation between PPARγ protein level in granulosa cells and pregnancy rate in women undergoing in-vitro fertilization (IVF) treatment.

Materials and Methods: In this cross-sectional study**,** twenty-five samples of granulosa cells were collected from women referred to an IVF treatment center. PPARγ protein expression level in granulosa cells was determined in comparison with β-actin level as control gene with Western blot test. Laboratory pregnancy was determined by a rise in blood β-hCG level fourteen days after embryo transfer. Correlation analyses were used to test for associations between the oocytes and pregnancy occurrence as outcome variables and PPARγ protein expression level.

Results: Correlation analysis indicated that there was no significant relationship between granulosa cells PPARγ protein level with IVF parameters including number of matured oocytes and the ratio of fertilized to matured oocytes. Comparison of granulosa cells PPARγ protein level with positive and negative laboratory pregnancy revealed also no significant relationship.

Conclusion: According to the results of this study, PPARγ protein level in granulosa cells could not be directly correlated to the success rate of IVF.

Key words: *In-vitro fertilization, Peroxisome proliferative-activated receptor γ, Granulosa cells, Pregnancy rate.*

Introduction

Different studies show that various factors may potentially affect IVF success rate (1). PPARγ (peroxisome proliferative- activated receptor gamma) has been known as an important regulatory factor in fertility (2). PPARγ gene is located on the short arm of the chromosome 3 and consists of 9 exons with more than 100 kb (2). PPARγ is a member of intracellular (nuclear) receptors and belongs to the steroidal /thyroidal receptor family (3).

After ligand to receptor binding and forming active complex, receptor can attach to some portions of DNA, called PPAR response element (PPARE) to modify gene expression level (3). Some natural ligands such as unsaturated fatty acids or synthetic agents act as activator of PPAR family (3, 4). Subgroup γ of PPARs plays important roles in gluconeogenesis, biosynthesis, deposition and catabolism of lipids. PPARγ increase insulin sensitivity and as a result decrease blood glucose in patients with type II diabetes mellitus (3). It has been shown that decreased PPARγ activity relates to decreasing hormone biosynthesis in ovaries (5). Antoine *et al* (6) showed that PPARγ acts as modifier gene in general population in contrast to patients with polycystic ovary syndrome (PCOS). Expression of this gene has been detected in different stages of folliculogenesis and the highest expression level has been reported after follicle releasing and LH surge (4).

Recent studies showed that PPARγ plays an important role in ovary tissue changes during ovulation, as well as facilitation of ovulation in the every cycle of menstruation in mammals (2). Fan *et al* (7) showed that PPARγ blocks androgen conversion to estradiol by inhibiting the expression of aromatase. The production of estradiol by ovaries plays an important role in uterine